NEW INFORMATION ON THE AUSTRALIAN SMALL BITTACIDS (MECOPTERA)

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The unrecorded male and additional females of the small and little known scorpion-fly *Symbittacus scitulus* Byers have been found at three north Queensland montane rainforest localities. The male terminalia are similar to those of *Edriobittacus* Byers. New localities for the other small Australian bittacids show that *Austrobittacus anomalus* Riek occurs in the coastal zone between Bundaberg and Rockhampton, *Tythobittacus macalpinei* Smithers extends into south-east Queensland, and *Edriobittacus microcercus* (Gerstaecker) is widely distributed between Bundaberg and Cairns. □ *Mecoptera, Bittacidae, Edriobittacus, Tythobittacus, Austrobittacus, scorpion-fly, rainforest, Queensland, new records.*

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The Australian bittacid fauna comprises 6 genera. The monotypic *Austrobittacus* Riek, *Edriobittacus* Byers, *Symbittacus* Byers and *Tytthobittacus* Smithers are small and delicate forms, which have AA_{3+4} (=*1A* of other notations) of the hindwing much reduced. *Bittacus* Latreille (1 species) and *Harpobittacus* Gerstaecker (9 nominal species) are large and robust scorpionflies with AA_{3+4} of the hind wing well developed. Byers (1986) provided a key to all genera except *Bittacus*, which was differentiated by Lambkin (1988).

Symbittacus was erected by Byers (1986) for *S. scitulus* Byers, which was based on one female from rainforest of Bellenden-Ker Range, north Queensland. Since then, further collecting by G.B. Monteith and colleagues in montane rainforest south of Bellenden-Ker has brought to light a further five specimens, including the first male. An examination of the collections of the Australian National Insect Collection, Canberra (ANIC) has also revealed a female specimen from another north Queensland rainforest locality. Herein I record this new material and describe the male. As well, new diagnostic characters and new localities are given for *Austrobittacus*, *Edriobittacus* and *Tytthobittacus*. No new localities have been published for these taxa since their original descriptions or since Riek (1954). Full reference lists for each have recently been given by Smithers (1987) and are not repeated here.

All measurements are in millimetres. Other abbreviations used are as follows: ICZN, International Code of Zoological Nomenclature; KJL, author's collection (to be deposited in Queensland Museum); LFW, fore wing length; MV, Museum of Victoria, Melbourne; QM, Queensland Museum, Brisbane; UQ, The University of Queensland Insect Collection, Department of Entomology, University of Queensland.

Symbittacus scitulus Byers
(Figs 1A-C,2)

Symbittacus scitulus Byers, 1986, pp. 166-168, figs 1-6.

MATERIAL EXAMINED

QUEENSLAND: QM: 1♂,1♀ (both teneral), Cardwell Range, Upper Broadwater Ck valley, 700-800m, RF [rainforest], 17-21.xii.1986, 3♀♀, Kirrama Range, Douglas Ck road, 800m, 9-12.xii.1986, all G.Monteith, G.Thompson and S.Hamlet. ANIC: 1♀, Davies Ck, 20km E by S Mareeba, 20.xi.1981, D.H.Colless, Malaise trap.

LFW

♂ 14.9, ♀♀ 14.1-14.6 (holotype recorded by Byers (1986) as 14.1).

MALE TERMINALIA (Fig.1A-C)

Epiandrium short, plate-like, articulated on the anterodorsal corners of sternum 9; in lateral view (Fig.1A) narrow, arched dorsally at c.⅔ length; in dorsal view (Fig.1B) posterior margin broadly incised to c.⅔ length, resultant lobate paired lateral regions each with 5 short black spines medioapically. Posterior margin of sternum 9 with a few long setae dorsally. Basistyles completely fused medially; in lateral view ventroposterior margin evenly curved; dististyle-bearing lobes strongly produced. Dististyle (Fig.1C) small and simple, with strongly sclerotised glabrous apical knob; distinct 'stylocavernula' (Tjeder 1970) basally. Aedeagus of moderate length, recurved, without a terminal

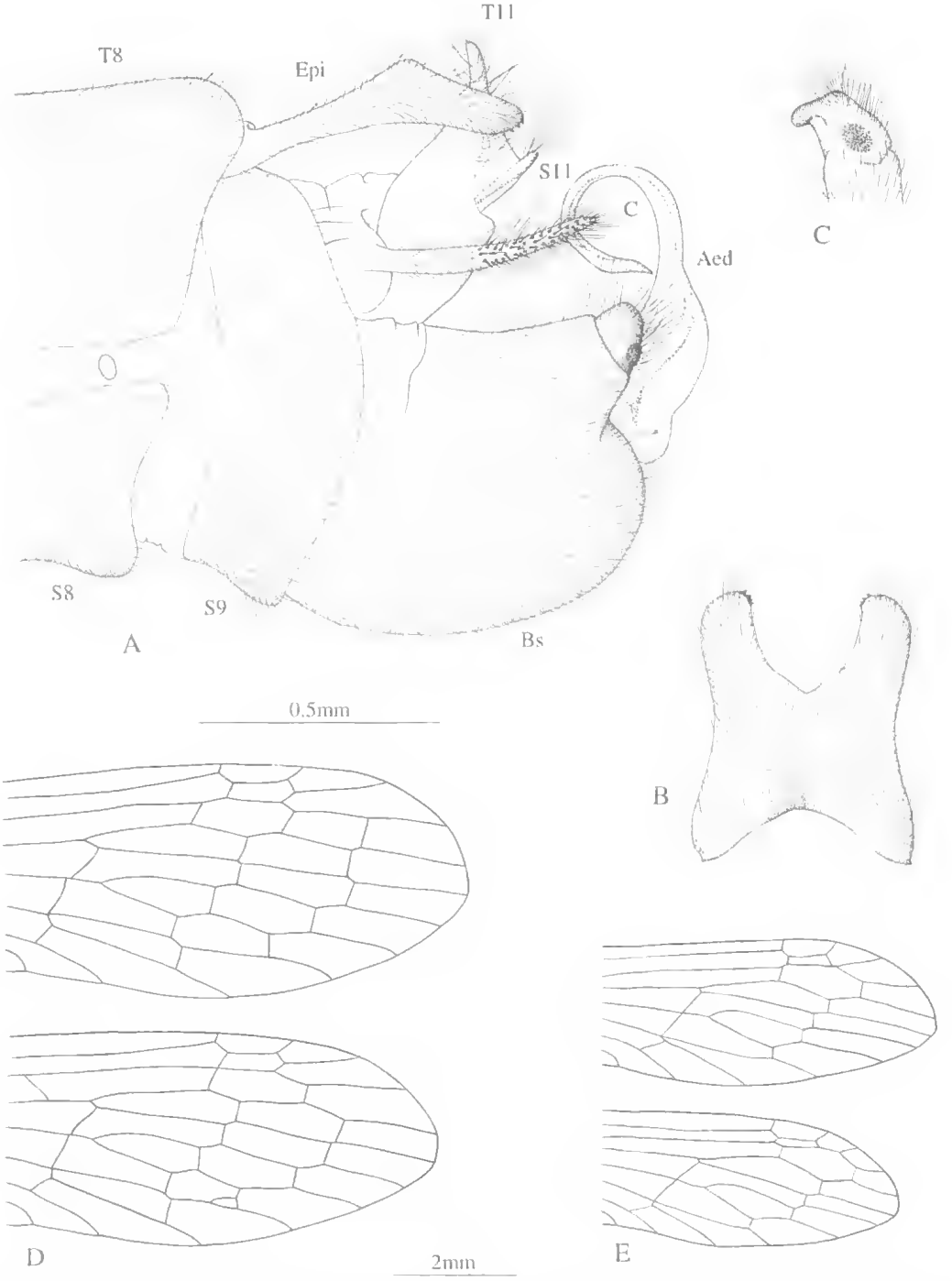

FIG. 1. A-C (0.5mm scale line). *Symbittacus scitulus*, male: A, apex of abdomen, left lateral; B, epiandrium, dorsal; C, right dististyle, posteroventral (darker circular area is the 'stylocavernula'). D,E (2mm scale line). Distal regions of right fore and hind wings (venation only shown): D, *Edriobittacus microcercus*; E, *Tytthobittacus macalpinei*. Abbreviations: Aed, aedeagus; Bs, basistyles; C, cercus; Epi, epiandrium; S8,9,11, sterna 8,9,11; T8,11, terga 8,11.

filamentous extension. Tergum 10 not detected (specimen teneral). Cercus elongate, reaching to level of dististyle; broadest at c.½ length, then tapering distally. Tergum 11 elongate, in posterior perpendicular view tapering to an acute apex. Sternum 11 much shorter than tergum 11, with apical margin truncate.

REMARKS

The new material compares well with Byers' (1986) description, but 2 minor variances can be noted. Byers recorded the ocelli as of uniform diameter. In all the new material (and, on re-examination, in the holotype as well) the lateral ocelli are slightly larger than the medial one. The number of thick black setae on each side of the 4th hind tarsomere, recorded as 1 by Byers, is variable. The holotype and one of the Kirrama females (both with fore wings 14.1 long) have 1 or 2, whereas the other specimens (which are larger) have 2. Unfortunately the male is teneral and not well preserved, but its non-genitalic structural features are similar to those of the female.

The male terminalia of *S. scitulus* are similar to those of *Edriobittacus microcercus* (Gerstaeeker) (Byers, 1974, figs 1-3). The latter differ, however, in the following: 1, the epiandrium in lateral view is arched before midlength (at c.⅔ length in *Symbittacus*), and more strongly so than in *Symbittacus*; in dorsal view it is much more deeply incised than in *Symbittacus*; 2, the aedeagus is longer; 3, there are numerous (rather than a few as in *Symbittacus*) long setae on the posterior margin of sternum 9; 4, tergum 11 is short with the apical margin truncate (elongate with apex acute in *Symbittacus*).

Symbittacus scitulus is a rainforest scorpionfly. It has only been taken at elevations of 700-800m. The specimens from Cardwell and Kirrama Ranges were collected at night while at rest on the foliage of understorey vegetation along tracks through rainforest (G.B. Monteith, pers. comm.).

Austrobittacus anomalus Riek
(Fig. 2)

Austrobittacus anomalus Riek, 1954, p.157, figs 3,4, pl.1, fig.6.

MATERIAL EXAMINED

QUEENSLAND: ANIC: holotype ♂, allotype ♀, 1 without abdomen, 4♂♂ and 10♀♀ paratypes, Rockhampton, 23.iii.1950, 1♀ paratype, Olsen's Caves, 13 miles N Rockhampton, 25.iii.1950, all I.F.B.Common; 1♂, 3♀♀, Pine Ck, 12 miles S Bundaberg, 12.iii.1976, 14.iv.1976, 1♂, Monduran Dam, 20km N Gin Gin, 2.ii.1974, all H.Frauca. KJL: 5♂♂, 6♀♀, Bruce Highway, Rosedale turnoff, 10km NW Gin Gin, 4♂♂, 6♀♀, near 'Wakelin', 20km NNW Gin Gin, all 20.iv.1985, K.J. and C.L.Lambkin.

LFW

♂♂ 14.0-15.3, ♀♀ 13.8-14.6 (Riek (1954) recorded 15.0 for the species).

REMARKS

Riek (1954) did not explicitly state which specimens were the holotype, allotype or paratypes. The holotype and allotype are labelled as such, but none of Riek's other specimens are labelled as paratypes. Riek did not, however, expressly exclude any of his specimens from the

FIG. 2. Distribution of *Symbittacus scitulus* and *Austrobittacus anomalus*.

type series (see ICZN Article 72(b)(i)), and I believe that there is sufficient evidence (see ICZN Recommendation 72B) to regard the 16 specimens listed above as paratypes (viz the collection data match those given by Rick, and the Olsen's Caves specimen matches that illustrated by Riek (1954, pl.1, fig.6) and stated to be a paratype in the figure caption).

This species is easily distinguished by the longitudinal form of the free apical portion of AA_{3+4} in the hind wing (Byers, 1991, fig.37.6C). The lateral ocelli are slightly larger than the medial one. The number of thick black setae on each side of the 4th hind tarsomere, recorded by Byers (1974) as 4-5, ranges from 2 to 7 and can vary from side to side in the same specimen.

All specimens have been taken in late summer or autumn. The Rosedale turnoff and Wakelin specimens were collected in the grass understorey of eucalypt woodland in company with *Edriobittacus microcercus* (at Wakelin only) and *Harpobittacus scheibeli* Esben-Petersen.

FIG. 3. Distribution of *Edriobittacus microcercus* and *Tytthobittacus macalpinei*.

Edriobittacus microcercus (Gerstaecker)
(Figs 1D,3)

Bittacus microcercus Gerstaecker, 1885, p.119.
Kalobittacus microcercus: Riek, 1954, pp.155-156, figs 1,2.
Edriobittacus microcercus: Byers, 1974, pp.165-167, figs 1-4.

MATERIAL EXAMINED

QUEENSLAND: ANIC: 1♂, 12 miles E Duaringa, 18.iii.1958, 4♂♂, 1♀, 25 miles N Gin Gin, 16(1♂) and 23.iii.1958, 2♂♂, 1♀, Hedlow Ck, nr Yeppoon, 22.iii.1958, all I.F.B.Common; 1♀, Ingham, 29.iii.1961, K.L.S.Harley; 1♂, Mackay, 17.v.1969, [G.F.] Bornemissza, 'flew to light'; 1♀, 63 miles N Marlborough, 9.v.1955, K.R.Norris; 1♂, Olsen's Caves, 13 miles N Rockhampton, 25.iii.1950, I.F.B.Common; 1♂, Palm Grove [?Cove], nr Cairns, June 1969, R.Hardie; 1 without abdomen, Pine Ck, 12 miles S Bundaberg, 12.iii.1976, 1♀, Pinock R, Hogback Range, WSW Bundaberg, via Gin Gin, 11.iii.1972, all H.Frauca; 1♀, 7 miles NNE Ravenshoe, 3300', 22.iv.1969, I.F.B.Common and M.Upton; 1 without abdomen, Rockhampton; 1♂, The Caves, 16 miles N Rockhampton, 3.iv.1967, M.S.Upton. KJL: 1♂, near 'Wakelin', 20 km NNW Gin Gin, 20.iv.1985, K.J. and C.L.Lambkin. UQ: 1♀, Walkamin, Atherton Tableland, August 1967, P.H.Twine. MV: 3♂♂, 3♀♀, 1 without abdomen, 'Queensland'.

LFW

♂♂ 16.3-19.7 (holotype recorded by Esben-Petersen (1921) as 18.0), ♀♀ 17.1-19.5

REMARKS

Both sexes have the lateral ocelli much larger than the medial one (noted in the male only by Byers, 1974), and the number of thick black setae on each side of the 4th hind tarsomere, recorded by Byers (1974) as 3, ranges from 2 to 5.

The holotype was from Peak Downs. The only other previous records are those of Riek (1954): the Olsen's Caves specimen in the ANIC, and the series labelled 'Queensland' in the MV. All specimens have been taken from March to August.

Tytthobittacus macalpinei Smithers
(Figs 1E,3)

Tytthobittacus macalpinei Smithers, 1973, p.300, figs 9-11.

MATERIAL EXAMINED

NEW SOUTH WALES: KJL: 1♂, Terania Ck, 22.i.1986, L.Müller and G.Theischinger. QUEENSLAND: UQ (all in poor condition): 1♂, 1♀, Brisbane, 8.x.1959, F.Lamberth, 9.x.1966, E.Rainey; 1♀, Kenilworth State Forest, 5.xii.1966, G.B.Monteith, 'sweeping ferns in rainforest'; 1♂, Mt Coot-tha, Brisbane, 26.ix.1959, A.J.Jackson.

LFW

Terania Ck ♂ 13.3 (Smithers, 1973, recorded 14.0 for the species)

REMARKS

T. macalpinei is very similar in wing venation to *E. microcercus*. Further to Byers (1986), it can be distinguished by its smaller size (LFW c.13.0-14.0, vs at least 16.3 in *E. microcercus*) and two series of crossveins in the distal region of both wings (Fig. 1E) compared to three in *E. microcercus* (Fig. 1D). The latter character is particularly useful in identifying faded or teneral females, which Byers' key will not separate. The lateral ocelli are slightly larger than the medial one and there are 1-3 thick black setae on each side of the 4th hind tarsomere.

Smithers' (1973) material was all from New South Wales: Huonbrook, Mooney Mooney Creek, Mt Wilson and Wentworth Falls. The Terania Creek and Kenilworth specimens were both taken in rainforest, the former in flight along a creek bed (G. Theischinger, pers. comm.) and the latter swept from ferns. The records from Brisbane and Mt Coot-tha, not obvious rainforest localities, are based on student collections and could be doubtful. All specimens have been taken from September to March.

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